

Amendments to the Claims

1 1. (currently amended) A method for selecting multiple paths between a
2 server and a client in an overlay network having a plurality of nodes
3 connected by links, the plurality of nodes including the server and the client,
4 each path including a set of selected links, comprising the steps of:
5 measuring, in each node of the overlay network, quality of service
6 metrics of each link directly connecting the node to an immediate
7 neighboring node in the overlay network;
8 transmitting the metrics to the server;
9 maintaining, in the server, the metrics, a link correlation matrix based
10 on the metrics, and a path correlation matrix based on the link correlation
11 matrix; and
12 selecting, in the server, the multiple paths based only on the metrics,
13 the link correlation matrix, and the path correlation matrix.

1 2. (original) The method of claim 1, further comprising:
2 streaming data from the server to the client via the multiple paths.

1 3. (currently amended) The method of ~~claim 1~~ claim 2, further comprising:
2 storing a copy of the streaming data only at the server.

1 4. (original) The method of claim 2, in which the streaming data are
2 multimedia.

1 5. (original) The method of claim 1, in which the link correlation matrix is

$$2 \quad Cr(L_{ij}, L_{mn}) = 1/2 + \frac{E[(L_{ij} - \bar{L}_{ij})(L_{mn} - \bar{L}_{mn})]}{2\sqrt{E(L_{ij}^2) - (\bar{L}_{ij})^2}\sqrt{E(L_{mn}^2) - (E(\bar{L}_{mn}))^2}},$$

3 where ij and mn are a pair of links connecting two nodes, E is an

4 expectation, L_{ij} and L_{mn} are the metrics for link ij and link mn , and an

5 average $\bar{L}_{ij} = E(L_{ij})$.

1 6. (original) The method of claim 1, in which the metrics include bandwidth,

2 latency, and packet loss rate of the link.

1 7. (original) The method of claim 1, in which the measuring, transmitting,

2 maintaining, and selecting are performed dynamically and periodically over

3 a time window.

1 8. (original) The method of claim 5, in which the path correlation matrix is

$$2 \quad Cr(Path_A, Path_B) = \sum_{a \in A} \sum_{b \in B} Cr(a, b),$$

3 where the path_A includes a link set $a \in A$ and the path B includes a link set b

4 $\in B$.

- 1 9. (original) The method of claim 8, further comprising:
2 first selecting a first path based on the metrics;
3 updating an available bandwidth of each link according to previously
4 selected paths;
5 determining a correlation cost (cc) for each link L with respect to a
6 previous selected link set S of a path as
7
$$Cr_S^L = \sum_{a \in S} Cr(L, a);$$

8 combining the correlation cost and the metrics to obtain a cost for
9 each link using a cost function

10
$$Cost_S^L = \alpha \cdot Cr_S^L + \sum_{i=1}^R \alpha_i W_r(i, j),$$

- 11 where W are the metrics, and α and α_i are weighting factors; and
12 selecting a next shortest path based on the updated cost $Cost_S^L$; and
13 repeating the updating, determining, combining, and selecting until
14 the plurality of paths have been selected.

- 1 10. (new) The method of claim 1, in which the link correlation matrix relates
2 each link to all other links based on the metrics.

- 1 11. (new) The method of claim 1, in which the path correlation matrix
2 relates each possible path to all other possible paths.